



Assembly and operating instructions - Water chillers -

(Spare Parts List)

Edition : 0105



Preface

With the water chiller, you have acquired a DK-quality product.

Water chillers by DK are manufactured according to the appropriate standards and recommendations.

Each plant is carefully inspected and submitted to a test run, which allows us to supply you with a reliable unit.

A long and trouble-free service life requires an expert installation and starting of the plant. For your own benefit, the following assembly notes should be exactly observed.

The documentation in your hand corresponds to the state of technology at the date of release. The manufacturer reserves the right to perform technical alterations according to the further development of the product.

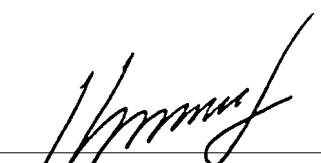
We wish you a successful application of the DK Water Chiller.

DK-Kälteanlagen GmbH
48282 Emsdetten

In accordance with EC machine directive 98/37 EC, article 4, paragraph 2, appendix II B

we herewith declare
that DK-Water Chiller systems –described above- are designed to cool down drinking water and service water in the assembly of a machine in combination with other components.

Commissioning the same is prohibited until it has been determined that the machine into which DK machine components are to be installed complies with the stipulations of the EC directive.



DK-Kälteanlagen GmbH
Bernd Kappenberg (MD)



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1. Safety notes

Please observe the following for your personal safety as well as for maintenance of your warranty rights :



- Repairs exceeding the extent of maintenance work as prescribed by this technical documentation are solely to be performed by trained experts with the necessary licences and the knowledge of generally applicable regulations of the VBG20/UVV/VBGA for "Electrical plants and equipment" as well as all applicable VDE* - regulations. For this, please refer to your responsible refrigerant experts.
- Maintenance work to be performed to the electrical plant is only permissible as long as it is guaranteed that the plant's electrical supply has been disconnected.
- DK-Kälteanlagen cannot be held liable for any damage caused by inappropriate handling or unauthorized intervention caused in particular to the electronic and electrical as well as refrigerating functional unit.
- The starting of the DK Water Chillers may solely be performed by those who are informed of the technical documentation concerning the appropriate use of the same. Knowledge of appropriate regulations for the prevention of accidents as well as other generally acknowledged instructions for technical safety is prerequisite.
- When cleaning the plant, please observe that water does not reach those electrical functional units which do not correspond with protective system IP 55.
- When handling cleaning agents and disinfectants, please observe the manufacturer's safety instructions carefully.

* German Association of Electricians

The written form of this documentation graphically emphasizes those instructions and notes to which particular attention should be paid.



...points out that non-observance may lead to personal injury or damage of the technical equipment.



... provides useful information concerning regulatory application or maintenance of the product's service value.

2. Service

In your own interest, please observe that necessary repair work within the warranty period may solely be performed by a service facility authorized by DK-Kälteanlagen GmbH.

You ensure your warranty rights by doing so.

Repair and maintenance work on electrical and refrigerant equipment is only to be performed by concessioned refrigerant companies holding the necessary licences. For this, please refer to "your" refrigerant specialists.

3. Fitting and assembly

The place of installation should be protected against frost and be provided with a floor drain.

The DK Water Chiller is a double-layer enamelled steel tank with a fitted cathodic protection against corrosion. The tank's strong design ensures that during normal handling the internal thermo-glazing is not damaged.

The storage tank of models KWR are made of raw steel. They are made for using in a closed water system e.g. air conditioning



It must be observed not to submit the equipment to hard concussions (e.g. by placing it hard on one foot when unloading from the lorry)!

No welding work may be performed to enamelled tanks!

Refinishing work on the enamelling is prohibited.

Insulation consists of 2 pieces of PUR-shells with a glass fiber reinforced plastic coating which is sealed against diffusion of vapour by the manufacturer.

Plant models KWB 90/... are insulated with a soft foam to prevent diffusion of vapour.

The two shells may not be dismantled for assembly.



The tank may only be moved by means of the provided aids for transportation (coloured marking). Do not charge water or refrigerant pipes.

The plant is to be assembled in such a manner that it may be viewed from all sides and with sufficient room available for maintenance work to be carried out.

4. Water connection

In order to limit flaws in the enamel coating as much as possible, the tanks are provided with inched external thread.



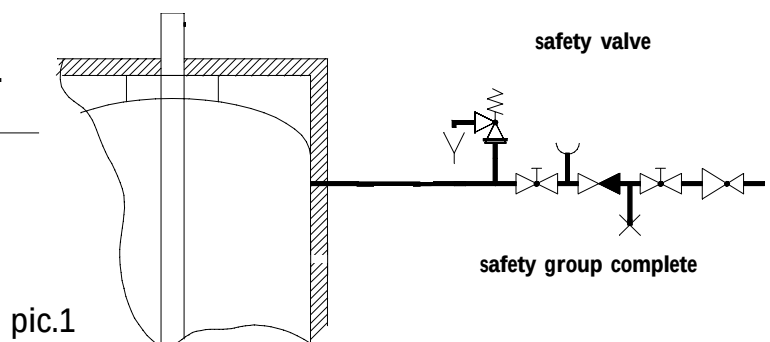
When performing the water connection, please observe not to use too much hemp, as too thick a hemp packing may damage the enamel in the connecting nipple.

Due to the expansion of water during temperature changes it is necessary to protect the DK-Water Chiller against excessive pressure.

Water connections are to be performed according to DIN 1988 and local regulations, i.e. a safety relief valve is to be installed according to the permissible operational excess pressure of the tank without shut-off option towards the same. Standard operational excess pressure 6 bar (see pic. 1).

Connection diameter of safety valves :

nominal capacity of tank	connection min.
up to 200 l	DN 15
over 200 up to 1000 l	DN 20
over 1000 up to 5000 l	DN 25



The exit side of the safety valves must be at least one nominal width larger than that of the entrance side.

The blow-out side must have at least the size of the safety valve - exit profile, however may not have more than 2 curves and may not be longer than 2 mtr. (see DIN 4753 Part 1).

The blow-off mouth must be accessible, visible as well as of such design that no injury will be inflicted on any person during blowing off.

If the admission pressure is higher than the tank's permissible operational excess pressure, the cold water pipe is to be fitted with a pressure reducing valve. (DK offers the water safety armature in compliance with such demands. This armature is fitted to the cold water inlet.)



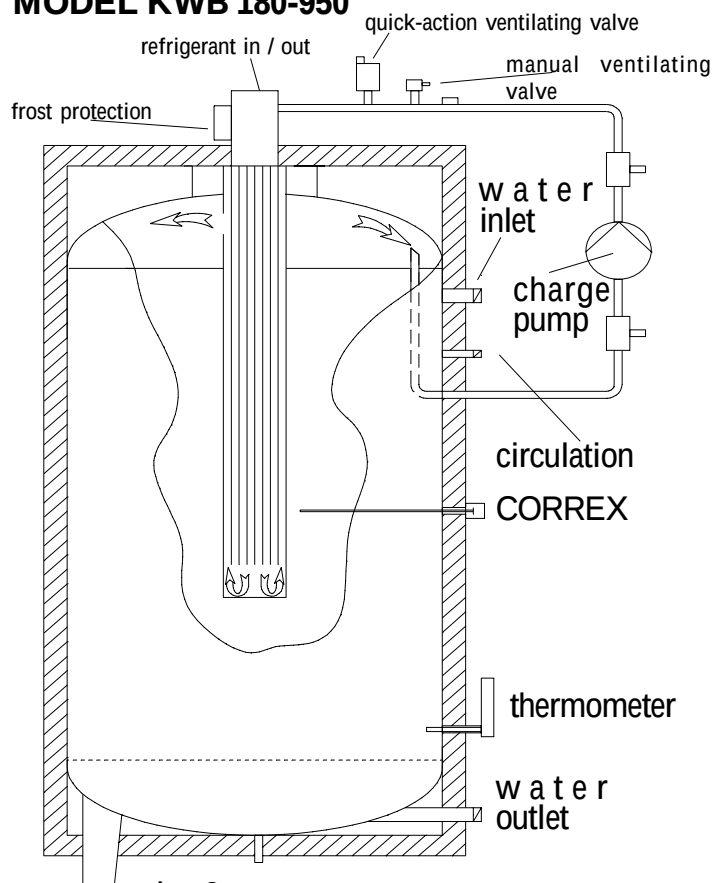
The fresh water inlet is to be connected to the tank's casing (on top, on the side).

The cold water outlet (flow pipe to the point of consumption) is to be connected to the bottom, on the side of the tank.

For the connection of the circulation pipe, solely the connection intended for this purpose is to be used.

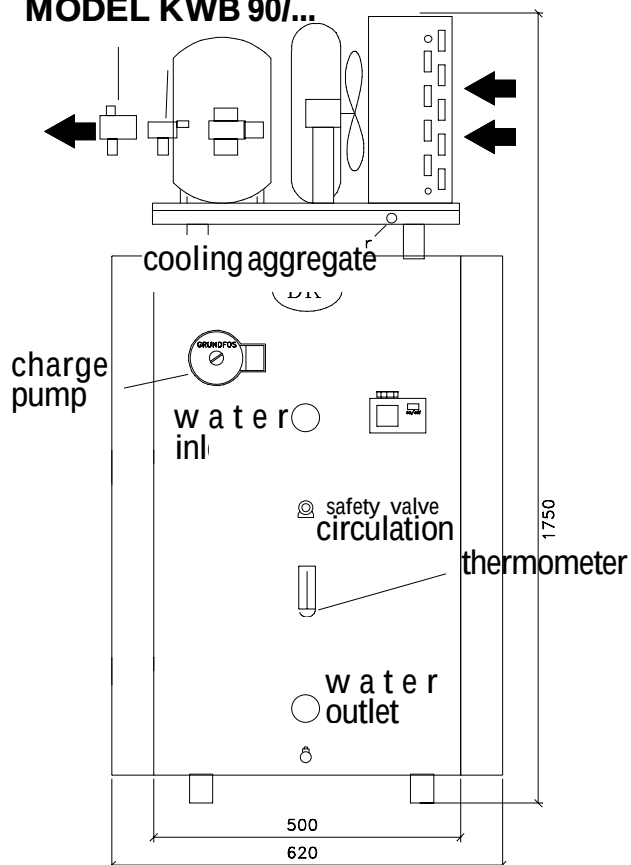
For the exact position of the connections, please consult the following drawing (pict. 2 & 3).

MODEL KWB 180-950



pict. 2

MODEL KWB 90/...



pict.3

5. *Electric supply*

Plants for alternating current require 1 x 230 V 50 Hz shock-proof socket.

Plants for rotating current require a CEE socket 3x400V, 50Hz.

For further details, please consult technical data of the refrigerant machine on page 26.

The exact circuit diagram is enclosed with the Water Chiller and can be found in the switch box.



Electric wiring is to be performed in accordance with regulations by the electric supply company and according to VDE 0100.

6. *Refrigerating plant*

The refrigerating plant has undergone a leak test with a test pressure of 27.5bar.

For the cooling of service water, DK's Water Chiller is generally fitted with a double-walled safety multi-pipe heat exchanger (60/x plants are equipped with a safety evaporator helix). The evaporator thereby corresponds to part 4 of DIN 1988. For leakage indication, a capillary pipe with safety valve is soldered to the evaporator in the gap (Schrader-valve in 7/16"-double nipple). The opening pressure amounts to 0.5bar (see pic. 6; page 8).

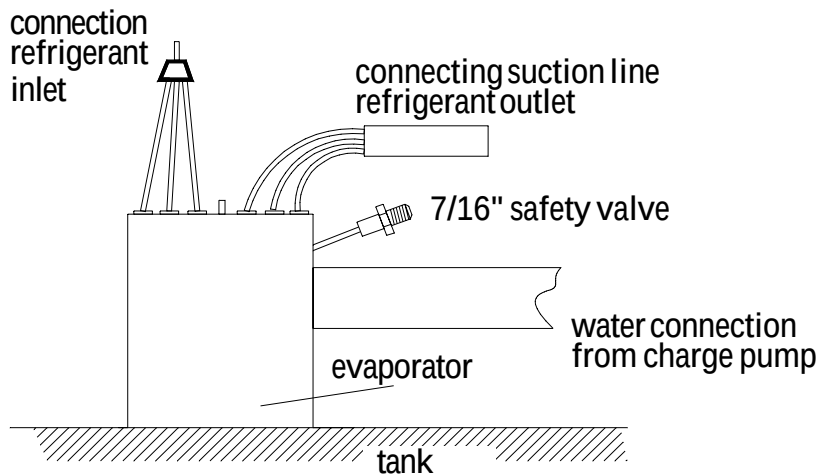


The conventional dimension of 7/16" used in the refrigerant industry does not apply to the refrigerant connection, but serves solely as leakage indication of the double walls.

Attention!

If any liquid exits the mouth, the evaporator (heat exchanger) is defective. In such a case, an expert is to be called instantly and is to perform a pressure test according to DIN 1988 part 8. The safety mouth may by no means be sealed.

Position of 7/16" safety valve



pic. 4



In accordance with VBG 20, the refrigerant plant is equipped with a high pressure (HP) switch tuned to a condensation temperature of +55°C .

This value corresponds to an ambient temperature of approx. +36°C.

Maximum ambient temperature must be ensured by sufficient ventilation of the premises.

The low pressure (LP) switch of the refrigerant plant disconnects itself in such conditions as well as in case of a lack of refrigerant or icing of the double-walled safety evaporator.

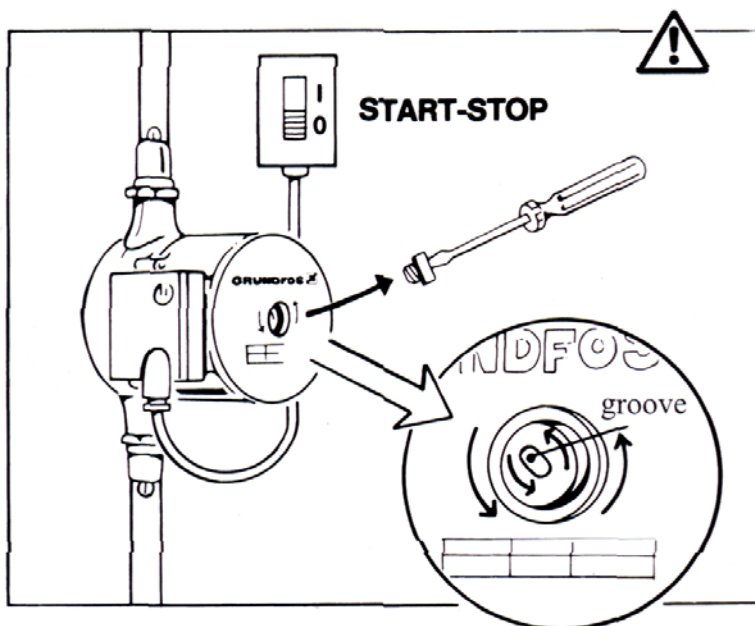
Observe range!

7. Starting the plant

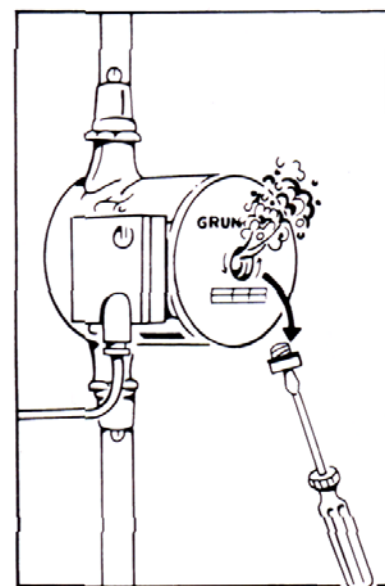


The Water Chiller may only be started after having been completely filled with water and after conscientious ventilation.

- Fill water into tank (equipment is switched off) while opening the manual ventilating valve at the highest point of the pump line (see pic. 2 page 6).
- Close manual ventilating valve only after air has completely escaped the tank.
- With alternating current plants, the Water Chiller is switched on at the thermo regulator, with rotary current plants at the main switch. The thermo regulator is already set to desired value temperature and has been checked. **Do not change thermo regulator!**
- Before starting, as well as at regular intervals, the functions of the CORREX® external current anode are to be verified; for this, please consult paragraph 8.
- For rotary current plants, attention must be paid to the correct rotating sense of the pump (see pic. 5) and to the ventilated motor. For this, see arrows on equipment indicating rotating sense.



pic.5



pic. 6



Charge pump

The sense of rotation is to be verified at maximum RPM (rotary current pumps) pic. 5.
Also vent pump at max. RPM (pic. 6).
If any, proceed in same manner with circulation pump.



The sound pressure level is below the limits stipulated by EG regulation 98/37EG for machines.

8. Corrosion protection

The DK Water Chiller is equipped with anodes for cathodic protection against corrosion.



CORREX® - external current anodes are maintenance free and are to be connected to a 230V socket.

The green indicator lamp on the connector potentiostat of the CORREX® external current anode must light continuously (socket approx. at mid-level of the tank).

In case of flashing of the red lamp, see paragraph 8.1.



The supplied double-wired line between the screw-in CORREX® anode connector potentiostat may by no means be elongated.

The possible reversal of polarity thereby entails an accelerated corrosion.

Electronics & Long Duration Anode, the maintenance-free protection against corrosion for Water Chillers. CORREX® UP - the external current anode for multi-purpose application in enamelled storage tanks of all sizes.

CORREX® UP - long term solution for corrosion problems



- reliable long-term protection
- exact regulation of protective current
- no over protection (risk of electrolyt gas)
- no consumption of anodes
- no creation of anode mud
- no maintenance
- visual operational control
- VDE / GS-SEV -tested
- safety for long storage service life



8.1. Malfunction overview CORREX - external current anode

Light :	cause • remedy :
green	operational control, full protection against corrosion
is not lit	no protection against corrosion - no supply voltage • re-connect supply voltage - supply voltage available, connector potentiostat defective • exchange connector potentiostat as soon as possible
flashes red	malfunction indicator, no protection against corrosion - no water in tank • fill with water - connecting wires reversed • see instructions for CORREX anode - wiring connection from connector potentiostat to anode rod interrupted • re-connect (observe polarity). - wiring connection from connector potentiostat to ground (tank) interrupted • check cable lugs on contact and corrosion - anode rod has contact to fittings in tank and therefore to ground • disable connection to ground and return electronics by quick pulling of the plug.

8.2. Malfunction overview of pumps

Malfunction :	cause • remedy :
pump does not start	- defective current supply • check fuses and possible loose clamps - defective condenser • exchange condenser - pump inhibited by residues in the bearings • unblock rotor, insert screw driver in slot and turn manually (pic. 5 page 9) - dirty pump • dismantle pump and clean it
plant makes noise	- air in plant • vent plant (disconnect plant for this).
pump makes noise	- air in pump • vent pump (pic. 6 page 9). - admission pressure too low • increase admission pressure or check gas volume in expansion tank (if any).



8.3. Malfunction overview plant

8.3.1. Alternating current plants 230V 50Hz

Malfunction :	- cause • remedy
Plant does not start	- no voltage • check fuses and any possibly loose cable connections and other fitted switchgear • connect switching thermo regulator (red button)
Aggregate does not start, circulation pump running	- frost-protection thermo regulator, thermo regulator might be set too low • set thermo regulator higher - air in plant • vent tank once again above manual ventilating valve while disconnected
Pressure switch-(dis)connects plant refrigerant	- electro valve has activated via LP switch • have it checked by specialists - increased condensation pressure due to choked condenser • clean finned grid at the cooling aggregate - increased condensation pressure due to ambient temperature above +36°C • lower ambient temperature - evaporating pressure too low caused by too little refrigerant (bubbles in the viewing glass) • have it checked by refrigerant specialists - circulation pump does not deliver water via evaporator • have circulation pump checked - insufficient ambient temperature • increase ambient temperature
Creation of condensation on pipes or connectors	- vapour-proof insulation damaged • overhaul insulation



8.3.2. Rotary Current Plants 400V 50Hz

Malfunction :	cause • remedy
Plant does not start	- no voltage supply • check fuses and any possibly loose cable connections and other fitted switchgear, connect main switch • operate switching thermo regulator (red button) - protective motor switch has activated (red control lamp) • verify voltage supply (fuses, missing external conductor), • release protective motor switch
Aggregate does not start, circulation pump running	- frost-protection thermo regulator, thermo regulator might be set too low (red control lamp) • set thermo regulator higher - air in plant • vent tank once again above manual ventilating valve while disconnected - pump operates in wrong sense of rotation • change sense of rotation
Pressure switch-(dis)connects plant	- electro valve has activated via LP switch • have it checked by refrigerant specialists - increased condensation pressure due to choked condenser • clean finned grid at the cooling aggregate - increased condensation pressure due to ambient temperature above +36°C • lower ambient temperature - evaporating pressure too low caused by too little refrigerant (bubbles in the viewing glass) • have it checked by refrigerant specialists - circulation pump does not deliver water via evaporator • have circulation pump checked - insufficient ambient temperature • increase ambient temperature
Creation of condensation on pipes or connectors	- vapour-proof insulation damaged • overhaul insulation

9. Maintenance

DK's enamelled Water Chillers are standard-equipped with a CORREX® external current anode. This form of corrosion protection is maintenance-free.

Attention is to be paid to the green control lamp, which should be lit. When the red light flashes, please consult paragraph 8.1, 'Causes of malfunction'.

The operation of water relief valve is to be verified at regular intervals (s paragraph 9.1.).



The air-cooled finned condenser - refrigerant machine - guides waste heat into the surrounding air.

In order to guarantee a troublefree operation, the fins are to be cleaned, depending on the degree of soiling.

9.1. Maintenance of the water relief valve



During the operation of the plant, the operational control is to be verified at regular 6-monthly intervals by checking the responsiveness of the water relief valve. It is to be observed whether the valve closes again after release of venting equipment and whether the collected water drains off completely via the funnel or the blow-off pipe.

9.2 Maintenance of pressure reducer



During operation of the plant, the set delivery pressure at the pressure gauge (visual control) is to be verified at zero flow rates and at peak flow rates (large output). The operator is to perform such an inspection on an annual basis.

Pressure reducers are regulatory devices with low adjusting force and are therefore extremely prone to impurities.

The sieve is to be cleaned and in certain circumstances to be replaced. The interior components are to be checked on their perfect state and if necessary, be replaced.

Such maintenance procedures are to be performed by the installation specialists every 1 to 3 years, depending on the local operational conditions.

10. Closing down

Switch cooling aggregate off via thermo regulators (red button).

For service water chillers with built-in CORREX external current anodes, the latter may only be disconnected after the water has exited the tank.

In order to empty the tank, disconnect the water inlet, vent the tank and empty it at the lowest point.

After this, the system may be released from voltage by unscrewing the fuses or by pulling the supply plug or by disconnecting the main switch.



Service water plants which are not taken into operation within 4 weeks after their assembly, or which have been closed down for more than six months, are to be shut off at the house connection (mains shut off armature) and emptied.

Service water plants which may be submitted to frost effects are to be emptied in time.



11. Re-Starting

When re-starting, after having interrupted operation, it is usually sufficient to completely open the individual points of outlet for a short time (approx. 5 minutes) in order to drain residual water in the pipes.

Re-start plant according to instructions in paragraph 7 on page 10.



12. Spare Parts List

Technical refrigeration accessories in order of volume of tank

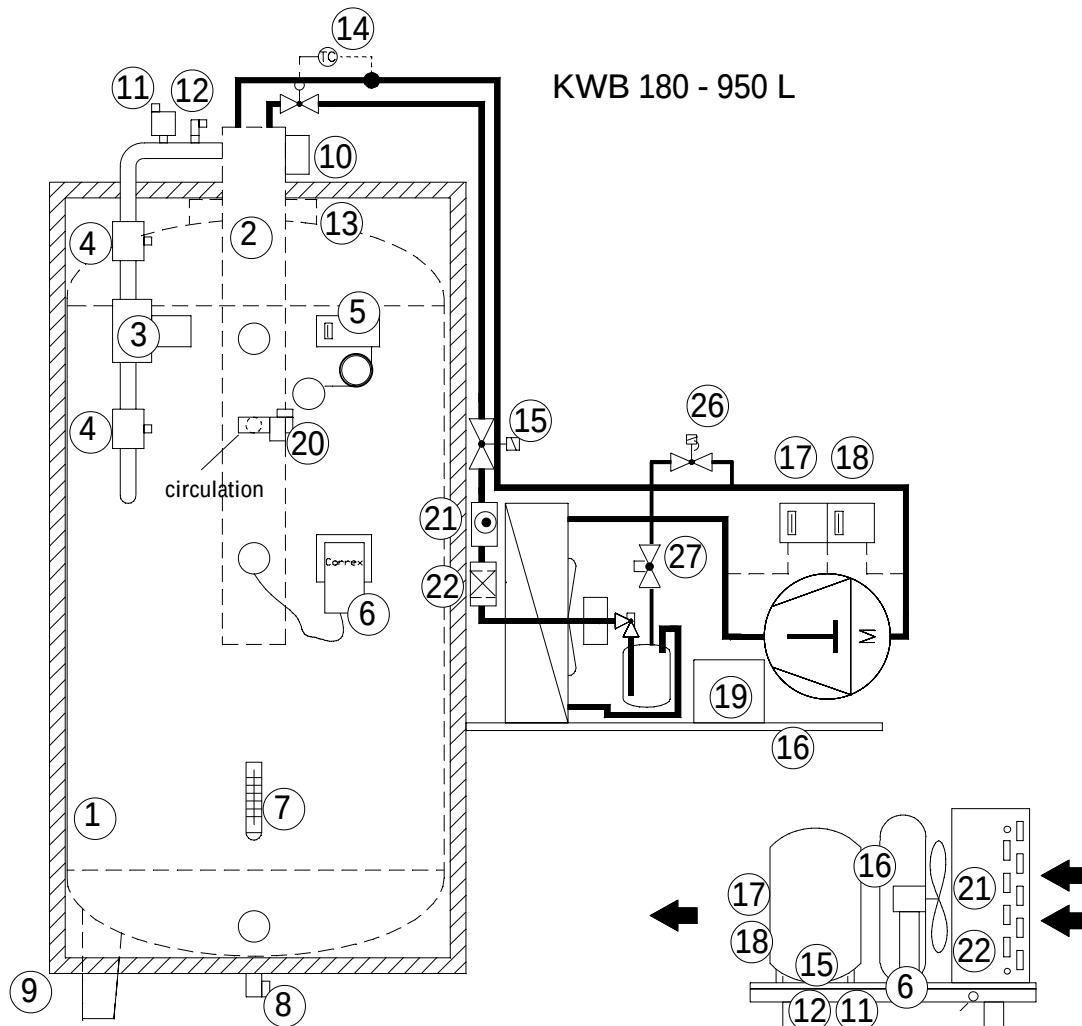
t a n k weight plant(kg)	cooling- aggregate	evaporator	charge pump	expansion- valve - nozzle	dryer	sightglass	solenoid valve	switch box
180 l (180kg)	CAE9460z	54/4 1,0	UP20-30	TES2-0	DN032	SGI6IA	EVR3..	-----
180 l (195kg)	CAJ9480z	54/4 1,2	UP20-30	TES2-1	DN052	SGI6IA	EVR3..	-----
280 l (215kg)	CAJ9510z	54/4 1,3	UPS25-60	TES2-1	DN052	SGI6IA	EVR3..	-----
280 l (230kg)	TAJ4517z MGE16	64/6 1,3	UPS25-60	TES2-2	DN083	SGI10IA	EVR6..	FT3200
400 l (260kg)	TAJ4517z MGE16	64/6 1,3	UPS25-60	TES2-2	DN083	SGI10IA	EVR6..	FT3200
400 l (280kg)	TAH4524z MGE22	76/10 1,2	UPS25-60	TES2-3	DN083	SGI10IA	EVR6..	FT3200
400 l (315kg)	TAH4531z MGE28	76/10 1,7	UPS25-60	TES2-4	DN083	SGI10IA	EVR6..	FT3200
700 l (360kg)	TAH4524z MGE22	76/10 1,2	UPS25-60	TES2-3	DN083	SGI10IA	EVR6..	FT3200
700 l (395kg)	TAH4531z MGE28	76/10 1,7	UPS25-60	TES2-4	DN083	SGI10IA	EVR6..	FT3200
950 l (475kg)	TAG4546z MGE36	89/14 1,6	UPS25-60	TES2-5	DN083	SGI10IA	EVR6..	FT3200
950 l (475kg)	TAG4553z MGE40	89/14 1,8	UP25-80	TES2-5	DN083	SGI10IA	EVR6..	FT4300
950 l (495kg)	TAG4561z MGE50	108/20 1,5	UP25-80	TES2-6	DN083	SGI10IA	EVR6..	FT4300
950 l (510kg)	TAG4568z MGE64	108/20 1,7	UP25-80	TIE 5	DN084	SGI12IA	EVR10	FT4300
950 l (615kg)	TAN4610z MGE80	108/20 2,3	UP32-80	TIE 6	DN304	SGI10IA	EVR10	FT4300
950 l (635kg)	TAN4612 MGE100	133/28 2,0	UP32-80	TCLE600 SW B6B	DN304	SGI10IA	EVR10	FT4300



Spare parts list of 90 ltr. multi-compressor plants model 90/1 to 90/4

	KWB 90/1	KWB 90/2	KWB 90/3	KWB 90/4
Cooling-Aggregate	AEZ 4425	CAJ 4452	CAJ 4461	CAJ 4511
Evaporator	16/10 0.4m ²	16/10 0.8m ²	18/12 1.2m ²	22/16 2.0m ²
Charge pump	UP20-30NK	UP20-30NK	UP20-30NK	UP20-30NK
E-valve nozzle	TIS 0	TIS 1	TIS 1	TIS 2
Dryer	DN 032s	DN 032s	DN 032s	DN 053s
Viewing glass	SGI 6s	SGI 6s	SGI 6s	SGI 10s
Electrto valve	EVR 2L	EVR 2L	EVR 2L	EVR 6L
Pressure switch	O17 6758	O17 6758	O17 6758	O17 6758
Tank	90L	90L	90L	90L
Covering cap	90/1	90/2	90/3	90/4
Weight (kg)	120	135	135	140

12.1. Overview of spare parts list

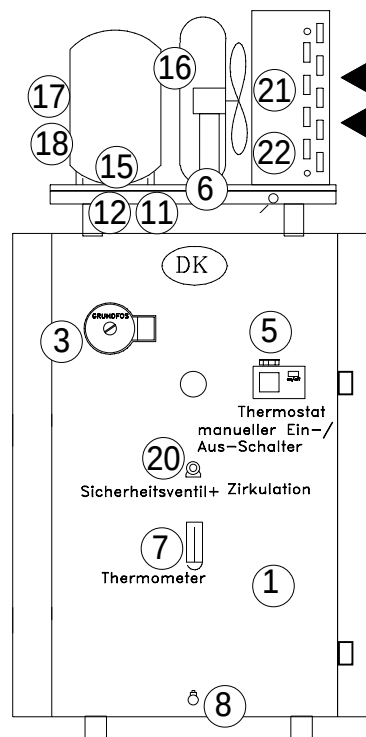


pic. 8

KWB 90/...
(below mentioned
parts are fitted
under the cover)

- ② ⑬
- ⑩ ⑭

pic 9





12.2. Spare parts list with order numbers

Pos.	Article	Order Nr.
1	service reservoir	see list page 18/19
2	condenser	see list page 18/19
3	charge pump	see list page 18/19
4	shut-off valve	none
5	thermo regulator	S30020
6	Correx anode (titanium rod + connector potentiostat) not for KWB 60/... -plants	S3000
7	thermometer	S33600
8	draining cock not for KWB/60...-plants	S21602
9	PUR insulation not for KWB/60...-plants	see list page 18
10	frost-protection thermo regulator	S30021
11	quick action ventilating valve	S21603
12	manual ventilating valve	S21604
13	flange gasket	S21600
14	expansion valve (valve + fitted nozzle)	see list page 18/19
15	electrovalve	see list page 18/19
16	cooling aggregate	see list page
17	HP switch	S30022
18	LP switch	S30023
19	switch box not for 230 V plants and KWB 60/...	see list page 18
20	safety relief valve	S21601
21	viewing glass	see list page 18/19
22	dryer	see list page 18/19
23	water safeguard armature 3/4"	S30009
24	water safeguard armature 1"	S31009
25	circulating pump UP 20-15NK with switch clock	S30024
26	evaporative pressure regulator	S30025
27	shut-off valve for evaporative pressure regulator	S30026



13. Description of Plant

The refrigerant plant is designed for and set to the cooling down of service water of a maximum temperature of +25°C to a maximum temperature of +2°C.

The condenser (pos.2) consists of a double-walled safety multi-pipe heat exchanger (for 60/x-plants double-walled safety condenser helix) with a water conduit system and is fitted to the service water reservoir (pos.1). On the water-carrying side, the safety heat exchanger is flooded via the charge pump (pos.3).

On the refrigerant-carrying side, the same heat exchanger is equipped with a thermo regulatorx expansion valve (pos.14) and connected to the cooling aggregate (pos.16).

The cooling aggregate is equipped with a condenser, a dryer (pos.22), a viewing glass (pos. 21), and electrovalve (pos 15), an HP and an LP switch (pos. 17 & 18), a compressor, and rotary current plants have an additional switch box (pos. 19).

As anti-freezing protection, a frost-protection thermo regulator (pos.10) is mounted to the safety multi-pipe heat exchanger and if the need arises, the cooling aggregate is disconnected whilst the charge pump remains activated in order to avoid freezing.

The water temperature is adjusted via the thermostates (pos. 5) installed above the service water reservoir which controls the cooling aggregate.

For adjustment of the permissible operating excess pressure of the individual pressure level (LP and HP side), the HP or the LP switch respectively operate the cooling aggregate.

14. Technical data

Company installing plant (stamp) :

User : _____

Inventory Nr.: _____

Monitoring Nr.: _____

Place of installation : _____

Technical data of the refrigerant plant :

Manufacturer :

L 'unite - Maneurop - DWM - other _____

Design of compressor :

fully airtight / semi-airtight

Condenser :

air cooled



MODEL : _____
Year of construction: _____ Design Nr.: _____
Capacity (kg) : _____ Refrigerant : R _____
Permissible operating excess pressure (bar) : _____
Nominal performance of driving motor (kW) : _____
Voltage (V/Ph/Hz) : _____
Nominal current (A) :: _____



FIRST AID

In case of injuries, accidents or intoxication, please contact the following telephone numbers immediately:

Emergency Tel.: _____

Fire Tel.: _____

Management Tel.: _____



Refrigerant filling

Only use the prescribed R _____ refrigerant !

Physical protection equipment

In case of larger escapes of refrigerant, if necessary, enter the machine room solely with a gas mask or with respiratory equipment and protect face and hands from direct exposure to refrigerant. § 23 concerning the regulations of the prevention of accidents of the VGB 20 entitled "Protection against exposure to refrigerants" is to be observed.



15. Certificate

for the testing of a refrigerant plant according to VGB 20 §15

1.) Identification data

DK-Kälteanlagen GmbH, D-48282 Emsdetten

Manufacturer's number : _____ Year of construction : _____
Model : _____ Refrigerant : _____
Highest capacity of refrigerant plant (kg) : _____
Permissible operating excess pressure (bar) : _____
Total weight of plant (kg) : _____
Type of plant : Compressor refrigerant plant with piston compressor

2.) Leak test

The refrigerant plant was submitted to a leak test at the site of fabrication by _____
(expert) on _____ (date).
Means of testing : _____, excess testing pressure _____ bar.
No defects became evident during the leak test performed.

3.) Acceptance test according to regulations on pressure tanks

The first testings of the refrigerant plant's pressure tanks have been certified by means of certificates and /or stamps. •

The pressure tanks of testing groups II and V have been submitted to an acceptance test according to TRB 531. No objections resulted from the testing. •

Checking the installation of the pressure tanks of the testing groups III and IV, for which an acceptance test has been completed, entailed no objections. •

The acceptance test of pressure tanks of the testing groups III and IV by the expert (§31 of pressure tank regulation) before installation

- is to be performed. •
- has been performed. •



4.) **Proper condition**

The proper condition of the refrigerant plant was checked by _____
(expert) on _____ (date) at the site of manufacture.
Testing resulted in no objections.

5.) **Functional testing of the safety equipment**

Before initial operation of the plant, the following safety equipment was checked on their operation by the expert :

Pressure control device : Disconnecting pressure	R _____	:	_____ bar	
	Connecting pressure	R _____	:	_____ bar
Low pressure control device	Disconnecting pressure	R _____	:	_____ bar
Frost protection thermo regulator :	Disconnecting temperature:	-1 °C		

6.) **Remarks**

This certificate is to be kept and stored in a safe place.

Emsdetten, _____
Date

expert



16. General data of the refrigerant plant

cooling- aggregate	soundlevel dB (A) a mtr. distance	nominal current A	c u r r e n t consumption maximum A	cooling- aggregate	soundlevel dB (A) a mtr. distance	nominal current A	c u r r e n t consumption maximum A	fuse protection A (inert)	mains supply V/Ph/Hz
AEZ4425 YHR	48	2,0	2,3	---	---	---	---	16	230/1/50
CAJ4452 YRH	57	4,0	4,4	---	---	---	---	16	230/1/50
CAJ4461 YHR	57,4	4,7	5,3	---	---	---	---	16	230/1/50
CAJ4511 YHR	60	6,0	7,3	---	---	---	---	16	230/1/50
CAE9460 ZMHR	57	3,5	4,0	---	---	---	---	16	230/1/50
CAJ9480 TMHR	60,5	4,2	4,7	---	---	---	---	16	230/1/50
CAJ9510 ZMHR	61	4,8	7,1	---	---	---	---	16	230/1/50
TAJ4517 ZHR	63	2,5	3,7	MGE16	59,0	3,93	4,5	16	400/3/50
TFH4524 ZHR	63	4,0	5,8	MGE22	59,0	4,92	4,5	16	400/3/50
TFH4531 ZHR	67	4,8	6,3	MGE28	58,1	7,21	5,3	16	400/3/50
TAG4546 ZHR	73	6,6	10,0	MGE36	66,6	9,18	10,8	16	400/3/50
TAG4553 ZHR	73	7,4	12	MGE40	66,6	10,17	12,13	25	400/3/50
TAG4561 ZHR	72	9,0	15,0	MGE50	67,7	12,13	13,8	25	400/3/50
TAG4568 ZHR	72	9,6	16,5	MGE64	67,9	15,8	18,4	25	400/3/50
TAN4610 ZHR	76	13,5	23,0	MGE80	72,4	19,7	22,7	35	400/3/50
TAN4612 ZHR	78	17,0	25,0	MGE100	74,9	22,7	28	35	400/3/50

